PHYSICS 11

NAME: _____

Review 1

1. What is the velocity of section A in m/s?

Vel = slope = $\frac{\text{rise}}{\text{run}} = \frac{.40\text{m}}{2} = .20\text{m/s}$

2. What is the velocity of section C in m/s?

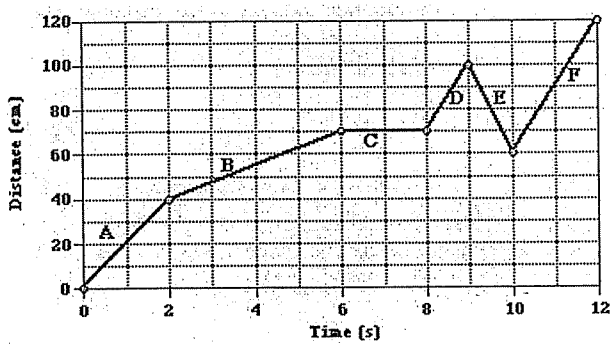
0 m/s

3. What is the velocity of section E in m/s?

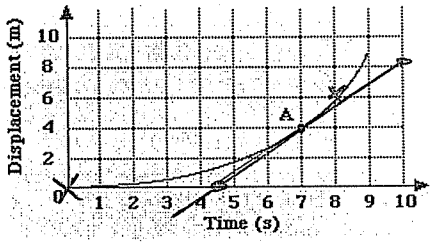
$\frac{\text{rise}}{\text{run}} = \frac{-.40\text{m}}{1\text{ s}} = -.40\text{m/s}$

4. What is the velocity of section F in m/s?

$\frac{.60\text{m}}{2} = .30\text{m/s}$



5. Examine the following graph and answer the questions.



(a) Find the instantaneous velocity at point A. – tangent so approx.

Velocity = slope = $\frac{8.2\text{m}}{5.5\text{s}} = 1.49\text{m/s}$

(b) What is the **average** velocity for the first 8.0 seconds of the trip?

slope between 2 points $= \frac{6\text{m}}{8\text{s}} = .75\text{m/s}$

6. A ball thrown straight up into the air reaches its highest point when its velocity and acceleration are equal to :

= 0 ; −9.8 m/s always

a)	velocity = + 9.8 m/s	acceleration = 0 m/s^2
b)	velocity = 0 m/s	acceleration = 0 m/s^2
c)	velocity = 0 m/s	acceleration = - 9.8 m/s^2
d)	velocity = 0 m/s	acceleration = + 9.8 m/s^2

7. If you thrown a ball upwards at 6.0 m/s how fast will the ball be moving when it returns to your hand (just before you catch it). Ignore air resistance?

6.0m/s downward

8. A traveler drives 568 km in 7.2 h. What is the average speed for the trip?

$V = \frac{\Delta d}{\Delta t} = \frac{568\text{km}}{7.2\text{Hr}} = 79\text{km/H}$

9. If you run with an average speed of 12.0 km/h, how far will you go in 3.2 min? $\times 60 = 192\text{s}$

12.0km/H ÷ 3.6 = 3.33 m/s

$d = V \cdot t = (3.33\text{m/s})(192\text{s}) = 640\text{m}$

10. If the average speed of your private jet is 8.0 x 10^2 km/h, how long will it take you to travel 1.8 x 10^3 km?

$V = \frac{d}{t}$, $t = \frac{d}{V} = \frac{1.8\times10^3\text{km}}{8\times10^2\text{km/Hr}} = 2.25\text{Hr}$

11. Light travels with a speed of 3.00×10^5 km/s. How long will it take light from a laser to travel to the moon (where it is reflected by a mirror) and back to Earth? The moon is 3.84×10^5 km away from the Earth.

$v = \frac{d}{t}$, $t = \frac{d}{v} = \frac{2(3.84 \times 10^5 \text{ km})}{3 \times 10^5 \text{ km/s}} = 2.56 \text{ s}$

(2 × 3.84 × 10^5 km: return distance)

12. A skier accelerates at 1.20 m/s^2 down an icy slope, starting from rest. How far does he get in 5.0 s?

$v_0 = 0$ m/s, $d = ?$, $a = 1.2$ m/s^2, $t = 5.0$ s

$d = v_0 t + \frac{1}{2} a t^2$

$= 0 + \frac{1}{2}(1.2)(5)^2 = 15$ m

13. What is the acceleration of an object that accelerates steadily from rest, traveling 10.0 m in 10.0 s?

$a = ?$, $t = 10$ s, $v_0 = 0$, $d = 10$ m

$d = v_0 t + \frac{1}{2} a t^2$

$10 = 0 + \frac{1}{2} a (10)^2$

$10 = 50a$

$a = \frac{10}{50} = .2 \text{ m/s}^2$

14. How long does it take an airplane, accelerating from rest at 5.00 m/s^2, to travel 360 m?

$t = ?$, $d = 360$ m, $v_0 = 0$, $a = 5.0$ m/s^2

$d = v_0 t + \frac{1}{2} a t^2$

$360 \text{ m} = 0 + \frac{1}{2}(5)(t^2)$

$360 = 2.5 t^2$

$t^2 = 144$

$t = 12$ s

15. A jet plane lands with a velocity of 115 m/s and can accelerate at a maximum rate of -5.25 m/s^2 as it comes to rest. From the instant it touches the runway, what is the **minimum time** needed before it comes to rest?

$v_0 = 115$, $t = ?$, $v_f = 0$, $a = -5.25$ m/s^2

$v_f = v_0 + at$

$0 = 115 + (-5.25)t$

$-115 = -5.25t$

$t = 21.9$ s

16. A car enters a tunnel at 24 m/s and accelerates steadily at 2.0 m/s^2. At what speed does it leave the tunnel, 8.0 s later?

$v_0 = 24$ m/s, $v_f = ?$, $a = 2.0$ m/s^2, $t = 8.0$ s

$v_f = v_0 + at$

$= 24 + (2)(8)$

$= 40$ m/s

17. A runner accelerates uniformly form rest at 1.40 m/s^2 for 8.00 s.

What is her final velocity? $v_f = v_0 + at$

$= 0 + (1.4)(8) = 11.2$ m/s

What is her average velocity? $\frac{v_0 + v_f}{2} = \frac{0 + 11.2}{2} = 5.6$ m/s

How far does she travel? $d = v_0 t + \frac{1}{2} a t^2$

$= 0 + \frac{1}{2}(1.4)(8)^2 = 44.8$ m

18. A rock is dropped from the 100th floor of a tall building (350 m above the ground). How long does it take to fall to the ground below and with what speed will it hit the ground at?

$d = 350$ m, $a = 9.8$ m/s^2, $v_0 = 0$ m/s

$v_f^2 = v_0^2 + 2ad$

$v_f^2 = 0 + 2(9.8)(350)$

$v_f = 83$ m/s

$v_f = v_0 + at$

$83 = 0 + (9.8)t$

$t = 8.45$ s

19. A ball is thrown straight upwards and reaches a maximum height of 95 m. With what initial velocity was it thrown? $V_0 = ?$ $d = 95\text{m}$ $V_f = 0$ $a = -9.8\text{m/s}^2$ $V_f = 0$

$V_f^2 = V_0^2 + 2ad$

$0 = V_0^2 + 2(-9.8)(95\text{m})$

$0 = V_0^2 - 1862$

$V_0^2 = 1862$

$V_0 = 43.2\text{ m/s}$

20. A baseball is throw straight upwards at 28.0 m/s.

a) To what maximum height will it reach? $V_0 = 28$ $d = ?$ $V_f = 0$ $a = -9.8\text{m/s}$

$V_f^2 = V_0^2 + 2ad$

$0 = 28^2 + 2(-9.8)d$

$0 = 784 - 19.6d$

$19.6d = 784$

$d = 40\text{m}$

b) How long will it remain in the air (from being thrown upwards to being caught)? $V_0 = 28\text{m/s}$ $t = ?$ $V_f = -28\text{m/s}$

$V_f = V_0 + at$

$-28 = 28 - 9.8t$

$-56 = -9.8t$

$t = 5.7\text{s}$

How many significant digits do each of the following have?

21. 103,450 — 5

22. 0.0250 — 3

Write each of the following in scientific notation:

23. 0.0832 — 8.32×10^{-2}

24. 64,200 — 6.42×10^{4}

25. How many seconds are in 24 weeks? $24\text{weeks}\left(\frac{7\text{days}}{\text{week}}\right)\left(\frac{24\text{hrs}}{\text{day}}\right)\left(\frac{3600\text{s}}{\text{hr}}\right) = 1.45 \times 10^{7}\text{s}$

26. How many kilograms are there in 132 pounds? There are 2.2 pounds in 1 kilogram.

$132\text{ pounds}\left(\frac{1\text{kg}}{2.2\text{ pounds}}\right) = 60\text{kg}$

Answers:

1. **0.20 m/s**
2. **0 m/s**
3. **-0.4 m/s**
4. **0.30 m/s**
5. **1.5 m/s, 0.75 m/s**
6. **C**
7. **-6.0 m/s**
8. **79 km/h**
9. **0.64 km**
10. **2.3 h**
11. **2.56 s**
12. **15 m**
13. **0.20 m/s^2**
14. **12 m/s S**
15. **21.9 s**
16. **40. m/s**
17. **11.2 m/s, 5.6 m/s, 44.8 m**
18. **8.45 s; 83 m/s**
19. **43.2 m/s**
20. **40 m, 5.7 s**
21. **5**
22. **3**
23. **8.32×10^{-2}**
24. **6.42×10^{4}**
25. **1.45×10^{7}**
26. **60 kg**